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Running Head: CHILD AND ADOLESCENT PSYCHOPATHY

Unique and interactive associations of callous-unemotional traits, impulsivity and grandiosity
with child and adolescent Conduct Disorder symptoms

Abstract

The construct of psychopathy remains underrepresented in the clinical diagnosis of Conduct Disorder (CD) as the *Diagnostic and Statistical Manual of Mental Disorders 5th edition* (DSM-5) only addresses one out of the three dimensions of child psychopathy, Callous Unemotional (CU) traits. This study tests if and to what extent there are unique and interactive associations of CU traits, impulsivity and grandiosity with child and adolescent CD symptoms. Data were collected from two separate community samples of children ($N=1599$; $M_{age}=9.46$, $SD=1.65$; 52% female) and adolescents ($N=2719$; $M_{age}=16.99$, $SD=0.99$; 49% female), who were followed longitudinally after a year. Hierarchical linear regression analyses were conducted, testing cross-sectional and longitudinal associations with CD symptoms, taking into account all three psychopathy dimensions. The cross-sectional findings indicate that only youth presenting a combination of all three psychopathy dimensions scored above the clinical cut-off score for CD. On the other hand, longitudinal findings provided evidence that the combination of high initial levels of CD and CU traits as well as the combination between CD, grandiosity and impulsivity can lead to clinical levels of future CD symptoms. Findings also indicated that CU traits and impulsivity more strongly predicted adolescent than child CD symptoms, and that CU traits were more strongly associated with boys' than girls' CD symptoms. Findings support the inclusion of CU traits as a specifier for the diagnosis of CD, and provide evidence that other psychopathy dimensions can also help clinicians to better understand and treat youth with CD, and should be considered for future revisions of the DSM.

Keywords: callous unemotional traits; impulsivity; grandiosity; conduct disorder; psychopathy; interactions

Introduction

The multidimensional construct of adult psychopathy has been extended to childhood and adolescence, with studies proposing three distinct but interrelated phenotypic dimensions of psychopathy: 1) an affective or Callous Unemotional (CU) dimension, 2) a behavioral or impulsive dimension, and 3) an interpersonal, grandiose or narcissistic dimension (e.g., Andershed, Hodgins, & Tengström, 2007; Frick & Hare, 2001). All three dimensions have been associated with antisocial behavior (i.e., bullying, aggression) and have been explored as relevant factors in subtyping youth with conduct problems (e.g., Andershed et al., 2007; Colins, Fanti, Salekin, & Andershed, 2016; Fanti, 2013; Fanti & Kimonis, 2012; Frick, Bodin, & Barry, 2000). Although distinct associations between all psychopathic dimensions with conduct problems have been identified, research aiming on testing heterogeneity in Conduct Disorder (CD; i.e., fighting, assaulting, lying and stealing) specifically has mostly been focusing on CU traits (e.g., Fanti, 2013; Kimonis, et al., 2015; see Frick, Ray, Thornton, & Kahn, 2014 for a review).

Based on this line of work, a “Limited Prosocial Emotions” specifier has been added to the *Diagnostic and Statistical Manual of Mental Disorders 5th edition* [DSM-5; American Psychological Association (APA), 2013] diagnosis of CD, and a similar modification is being considered for the International Classification of diseases 11th edition (ICD-11; Salekin, 2016). With much of the existing literature focusing on CU traits, the broader construct of psychopathy remains underrepresented in clinical diagnosis and understanding of CD (Salekin, 2016). The present study addresses this important gap in the literature by examining the contribution of all three dimensions of psychopathy in identifying meaningful CD subtypes. Specifically, we test if and to what extent there are unique and interactive associations of the different psychopathy dimensions with CD symptoms, assessed during childhood and adolescence. Both cross-sectional

and longitudinal associations will be investigated to add a developmental perspective to existing work and examine differences between the two methodological designs. The majority of prior work focuses on cross-sectional associations, and we aimed to test whether findings can be replicated after accounting for prior levels of CD symptoms. In addition, because the co-occurrence between CD symptoms with psychopathic traits is associated with more severe forms of antisocial behavior (e.g., Fanti, 2013; Fanti, Kimonis, et al., 2016; Frick et al., 2014), it is important to investigate how psychopathic traits interact with prior levels of CD symptoms in predicting continuity and severity in levels of antisocial behavior.

CU traits

CU traits (i.e., lack of remorse or empathy; callous use of others; shallow or deficient emotions) are believed to be a childhood precursor to adult psychopathy, capturing the construct's affective dimension (Frick, 2009). CU traits have been found to be associated with antisocial and aggressive behavior during both childhood and adolescence, with 12 to 46% of youth with CD presenting significant CU traits (Fanti, 2013; Frick, et al. 2014; Rowe, et al., 2010). Further, among children high on CD, those scoring high on CU traits were found to engage in severe and chronic antisocial behaviors, to be less engaged in treatment, and to have a poorer treatment prognosis (Colins, Van Damme, Fanti, & Andershed, 2016; Frick et al., 2014; Hawes & Dadds, 2007; Kahn, Frick, Youngstrom, Findling, & Youngstrom, 2012; Pardini, Stepp, Hipwell, Stouthamer-Loeber, & Loeber, 2012). However, these associations might reflect the shared variance between CU traits and other dimensions of psychopathy (e.g., Frick, Bodin, & Barry, 2000), which have received less attention in the child and adolescent literature. In addition, research has identified a group of youth who show elevated CU traits, but do not engage in CD behaviors (Christian, Frick, Hill, Tyler, & Frazer, 1997; Fanti, 2013). This raises

questions in terms of the importance of CU traits in identifying a high risk group of CD youth.

Another major question arising from this line of research is what are the unique characteristics of the group high on CD but low on CU traits (i.e., CD-only)? Is it possible that this group scores high on the other two dimensions of psychopathy?

Impulsivity

Impulsive and hyperactive problems tend to co-occur with CD symptoms, such as aggression, property destruction and serious rule violations, at a greater than random rate (Fanti, 2016; Waschbusch, 2002). The impulsive or behavioral dimension of psychopathy, constitutes a range of behaviors and traits that span from action without much forethought, reflection or consideration of the consequences, difficulties in self-regulation, sensation-seeking and proneness to boredom (Salekin, 2016). Several studies report the important role of impulsivity for explaining CD or disruptive behavior (e.g., Colins, Fanti, et al., 2016; Frick et al., 2000). With the use of executive functioning tasks, a recent study found that children with CD, irrespective of CU traits, showed impaired decision making and selective attention, which have been found to be associated with the adult behavioral dimension of psychopathy (Fanti, Kimonis, Hadjicharalambous & Steinberg, 2016). This study also demonstrated that a subgroup of children with CU traits scored low on neuro-psychological measures associated with the impulsive dimension of psychopathy, distinguishing the CU and impulsive dimensions of psychopathy in children (Fanti et al., 2016). In addition, Frick et al. (1994) identified two groups of children exhibiting CD, with one showing high impulsivity and the other high CU traits. Thus, impulsivity might characterize the group of youth that has been referred to in the literature as CD-only. A remaining question is how does the grandiose or interpersonal dimension fits in the diagnosis of CD?

Grandiosity

Individuals high on the interpersonal or grandiose dimension of psychopathy are characterized by a pervasive sense of grandiosity and self-importance and by a need to obtain continuous validation from others (Frick & Hare, 2001). These traits can be observed in childhood, tend to be relatively stable across development, and are related to problematic and antisocial behaviors (Jezior, McKenzie & Lee, 2015; Scholte, Stoutjesdijk, Van Oudheusden, Lodewijks & Van der Ploeg, 2010). Although children may rarely exhibit the severity or persistence of grandiose manipulative symptoms to warrant clinical attention, research suggests that the grandiose dimension of psychopathy is uniquely related to child and adolescent aggression and conduct problems (Barry, Frick, & Killian, 2003; Barry, Thompson, Barry, Lochman, Adler & Hill, 2007; Fanti & Henrich, 2015; Jezior, McKenzie & Lee, 2015). Moreover, individuals high on the grandiose dimension display aggressive behavior in the form of deceitful or manipulative behavior, and can become violent when feeling disrespected or challenged regarding their status (Fanti & Henrich, 2015). Munoz et al. (2013) found that grandiosity was the only dimension of psychopathy that significantly predicted unprovoked, proactive forms of aggression in detained adolescent boys. However, the contribution of grandiosity to CD received less attention than CU traits and impulsivity in the recent child and adolescent literature. Thus, the question as to whether the grandiose dimension is associated with a unique subtype of CD still remains unexplored.

Testing the combination of psychopathic traits

In addition to unique associations of the various psychopathy dimension and CD, a number of studies have shown that the combination of all three psychopathy dimensions better explains CD than either psychopathy dimension in isolation. These findings were replicated during

preschool, childhood, and adolescence, with the combination of the three dimensions being associated with severe behavioral and CD problems (Andershed, Kohler, Louden & Hinrichs, 2008; Christian et al 1997; Colins, Andershed, Frogner, Lopez-romero, Veen & Andershed, 2014; Colins, Fanti et al, 2016; Frick et al., 2000). Thus, the combination of all three dimensions may offer more predictive information than any single dimension. Further, after controlling for the overlap between psychopathic dimensions, the impulsive and grandiose dimensions, but not CU traits, have been found to be significantly related to aggressive and bullying behavior (Colins, Veen, et al., 2016; Fanti & Kimonis, 2012). As a result, reporting on *all* factor scores of psychopathy measures might be beneficial as it enables to examine the unique relation between psychopathy factors and various correlates of psychopathy. Frick et al. (2000) have reported that 73% of children scoring high on all psychopathic dimensions met the threshold for a diagnosis of CD or oppositional defiant disorder, whereas 38% of children high only on impulsivity, 25% of children high only on grandiosity, and 10% of children high only on CU met this criteria. Thus, the vast majority of children with a clinical diagnosis of CD might be characterized by a combination of psychopathic traits. These findings highlight the importance of examining the constellation of co-occurring psychopathy dimensions to understand the manifestation of CD.

Current Study

Despite the clinical importance of CU traits in case conceptualization and treatment planning for CD, it is only one of three dimensions of child psychopathy, highlighting the importance of addressing the contribution of the other two dimensions as well (i.e., impulsivity and grandiosity). The present study seeks to further investigate whether each of these psychopathic dimensions predict CD symptoms in two separate community samples of children and adolescents. Addressing all three dimensions deserves further attention, given the findings

pointing to the contribution of all dimensions in the prediction of conduct problems. Further, investigating how different psychopathic traits interact with prior levels of CD symptoms can provide important evidence for understanding the severity and continuity in levels of antisocial behavior.

To address key gaps in the literature, the following hypotheses will be tested using both cross-sectional and longitudinal designs. Firstly, do psychopathy dimensions contribute uniquely to the variance of the severity (i.e., above the clinical cut-off score) of CD symptoms in childhood and adolescence or is the combination a better predictor of this severity? To test this we aim to examine the interaction between CU traits, impulsivity and grandiosity in predicting concurrent CD symptoms. Based on prior studies (e.g., Andershed et al., 2008; Colins, Fanti et al., 2016; Colins, Noom, & Vanderplasschen, 2012), we expected the combination of psychopathic traits, but not each dimension in isolation, to be associated with clinical levels of CD symptoms. Secondly, we ask the question of whether the presence of all three psychopathic dimensions will predict future CD symptoms after taking into account prior levels of CD symptoms. We expected that baseline CD symptoms will explain the majority of variance in future CD, but that children and adolescents scoring high on CD with co-occurring psychopathic traits will show the highest continuity and severity in CD. To test this hypothesis, we will examine whether interactions between Time 1 CD symptoms and psychopathic traits predict Time 2 CD symptoms.

In addition, we took developmental stages into account in order to examine whether these associations are similar during childhood and adolescence. Prior work has indicated that psychopathic traits might be less stable during childhood (e.g., Fanti, Colins, Andershed, & Sikki, 2016) than adolescence (Kyraniades, Fanti & Panayiotou, 2016), suggesting that these

associations might be stronger during the adolescent than childhood developmental period. Such findings might suggest that children are more amenable to intervention or prevention efforts than adolescents. Finally, we aim to examine whether the relationship between the three psychopathy dimensions and CD vary across gender. A number of studies provided evidence that males and females might differ in the severity of CD symptoms they exhibit, with boys being at higher risk than girls (e.g., Fanti, 2013). Further, being high on all three psychopathy dimensions has been shown to be more strongly associated with anxiety symptoms among females and conduct problems among males (Colins, Fanti et al., 2016). Thus, in addition to main effects, gender may moderate the association between psychopathic traits and CD.

Methods

Participants and Data Collection

Data were collected during two developmental stages: childhood ($N=1599$; $M_{age}=9.46$, $SD=1.65$; 52% female) and adolescence ($N=2719$; $M_{age}=15.96$, $SD=0.99$; 49% female). The same questionnaire package was administered at both developmental periods. However, measures during childhood were collected from parents due to the young age of participating children, while measures during adolescence were based on adolescent self-reports. Both samples were followed longitudinally after a year with 8% attrition during childhood ($N=1471$; $M_{age}=10.25$, $SD=1.48$; 51.5% female) and 10% during adolescence ($N=2447$; $M_{age}=16.99$, $SD=1.65$; 49% female). Attrition was mainly due to an inability to contact students who had relocated or transferred to a different school. Children and adolescents who did not participate at Time 2 were compared to those participating longitudinally on child's gender, age, and Time 1 CD and psychopathic traits. There were no significant differences between groups according to chi-square and t-test analyses with small effect sizes (Cohen's $d < .20$). The sample was diverse in

terms of parental educational levels: 15% did not complete high school, 46% had a high school education, and 39% had a university degree, which is representative of the population in Cyprus.

Following approval of the study by the Cyprus Ministry of Education and the National Bioethics Committee, the first author randomly selected elementary and high schools in the four school districts (Larnaca, Lemesos, Paphos, and Lefkosia) in Cyprus to ensure that the sample is representative of the population in Cyprus. School administrators and personnel were provided with a description of the study, and the study was approved by the school boards of all participating schools. Before data collection, signed parental consent and youth assent were obtained. Families were also informed about the longitudinal nature of the study and their rights as participants. For the younger cohort (i.e., childhood), children were given a sealed envelope that included the questionnaires to be completed by both parents. Parents were instructed to place the completed questionnaires in a sealed envelope and return them to the child's school. Parents were also instructed that responses from both parents were required to participate in the study. Parents were allowed two weeks to complete the questionnaires, and after the two week period they received a reminder letter. All written communication between the parents and the researchers was via the participating students. For the older cohort, adolescents completed the questionnaires in class during school hours. Research assistants were available to assist adolescents with the completion of the questionnaires. No incentives or rewards were given to study participants.

Measures

To retain all participants during childhood, parent-reports were computed in a conservative fashion by taking the higher rating from mother and father reports, as done in prior work (Frick, Cornell, Bodin, Dane, Barry, & Loney, 2003; Kyranides, Fanti, Katsimicha, &

Georgiou, 2017). This method is beneficial for circumventing potential underreporting (e.g., Pardini, Lochman, & Powell, 2007) as well as handling missing data when only one informant is available. Adolescent self-report items were summed to form a total score.

CU traits. The *Inventory of Callous-Unemotional* (ICU; Frick 2004) traits is a parent- and self-report scale that assesses CU traits. It comprises of 24 items, which were completed by parents (e.g., “shows no remorse when he/she has done something wrong”) in the child cohort and adolescents (e.g., “I do not feel remorseful when I do something wrong”) in the adolescent cohort. Items are rated on a 4-point Likert-scale ranging from 0 (*not at all*) to 3 (*definitely true*). Item scores are summed to form a total score. Mother and father ICU total scores were highly correlated ($r = .69$), and were combined at the item level ($\alpha = .85$). The Cronbach’s alpha (α) for the adolescent sample was .80. Previous research has verified the reliability and validity of the ICU in community samples of children and adolescents (e.g., Fanti, 2013; Fanti, Frick, & Georgiou, 2009; Fanti, Panayiotou, Lazarou, Michael, & Georgiou, 2016).

Grandiosity and impulsivity. The *Antisocial Process Screening Device* (APSD; Frick & Hare, 2001) is a parent- and self-report rating scale designed to assess dimensions of psychopathy among youth, for which substantial support for reliability and validity has been reported (e.g., Frick & Hare, 2001). APSD items are rated on a 3-point Likert scale ranging from 0 (*not at all true*) to 2 (*definitely true*). For the present study, data from two of the three APSD subscales, impulsivity (5 items; parent $\alpha = .70$; adolescent $\alpha = .64$; e.g., “do not plan ahead or leave things until the last moment”) and grandiosity or narcissism (7 items; parent $\alpha = .75$; adolescent $\alpha = .72$; e.g., “act charming or nice to get things I/he/she want”), were collected. Mother and father reports for both scales were highly correlated ($r = .65-.70$), and were combined at the item level.

CD symptoms. The *Checkmate plus Child Symptom Inventory for Parents-4* (CSI-4; Gadow and Sprafkin 2002) and the *Youth's Inventory-4* (YI-4; Gadow & Sprafkin, 1999) were used to assess CD (15 items; e.g., “stolen things from others using physical force”) based on the diagnostic criteria specified in the *DSM* (APA, 1994). The CSI-4 and YI-4 were administered at two-time points, one year apart, and parents and adolescents indicated the frequency that the child or adolescent, respectively, engaged in CD on a 4-point scale ranging from 0 (*never*) to 3 (*very often*). The items were summed to create an overall CD scale, which exhibited adequate internal consistency in the current study based on parent reports (α : $t_1=.88$, $t_2=.89$) and adolescent self-reports (α : $t_1=.86$, $t_2=.88$). Mother and father reports were highly correlated across time ($r_{range}=.72-.76$), and similar to psychopathic dimensions were combined at the item level. Gadow et al. (2002) indicated that symptom severity is classified as moderate when over 3.5 on average, and considered as high severity (i.e., clinical cut-off) when over 6 on average. Previous research has provided evidence for the validity of the CD variable measured with the CSI-4 and YI-4 in community and clinical samples in Cyprus and U.S. (Fanti et al., 2016; Fanti, Demetriou & Kimonis, 2013; Gadow et al., 2002).

Plan of Analysis

Two separate hierarchical linear regression analyses were conducted, with the first testing cross-sectional associations with CD symptoms and the second testing longitudinal associations. In both analyses, we controlled for demographics in step 1 - gender (coded with 0 for boys and 1 for girls) and age (coded with 1 for childhood and 2 for late adolescence). In step 2 of each hierarchical linear regression model, we included the three psychopathic dimensions (i.e., grandiosity, impulsivity, and CU traits). The longitudinal analysis was similar to the cross-sectional analysis, although we included Time 1 CD symptoms in step 3 to test for longitudinal

associations with Time 2 CD symptoms above and beyond psychopathic traits. Subsequent steps included the 2-way, 3-way, and 4-way interactions between all the variables under investigation and interactions with age and gender. To probe the interaction effects we used the procedures described by Aiken and West (1991). All variables were centered to facilitate ease of interpretation of the significant interaction terms. Tables 2 and 3 only report the significant interactions.

Results

Demographic statistics and correlations between the main study variables are shown in Table 1. CU traits were correlated to a moderate degree with other dimensions of psychopathy. The correlation between grandiosity and impulsivity was stronger than the correlation with CU traits. All three psychopathy dimensions were similarly correlated with CD symptoms across time. According to paired-sample t-test, there was a significant mean-level increase in CD from Year 1 to Year 2, $t(3595) = 8.44, p < .001$.

Cross-sectional associations with CD symptoms

In the first step of independent variables (Table 2), gender and age were significantly associated with Time 1 CD, suggesting that boys were at higher risk for CD than girls, and adolescents scored higher on CD symptoms than children. All three psychopathy dimensions included in step 2 predicted CD symptoms, with grandiosity showing the stronger association. The significant interaction between CU traits and gender indicated that the association between CU traits and CD was stronger for boys ($\beta = .24, p < .001$) than girls ($\beta = .18, p < .001$). Two significant interactions with age were identified, with the first indicating that the association between CU traits and CD was stronger for adolescents ($\beta = .22, p < .001$) than children ($\beta = .18, p < .001$), and similarly that the association between impulsivity and CD was stronger for

adolescents ($\beta = .31, p < .001$) than children ($\beta = .17, p < .001$).

Additionally, all 2-way interactions between psychopathy dimensions were significant. However, because the higher order 3-way interaction between them was also significant, we only explicate the 3-way interaction, which is depicted in Figure 1. The high and low points in the graphs represent values one standard deviation above and below the mean. As shown in figure 1, the combination of all three psychopathy dimensions was associated with higher severity in CD symptoms (i.e., above the clinical cut-off score: > 6). The effect of CU traits also varied based on levels of grandiosity and impulsivity, with the stronger associations identified when both grandiosity and impulsivity were high ($\beta = .36, p < .001$), and when grandiosity alone was high ($\beta = .30, p < .001$). When both grandiosity and impulsivity were low, CU traits significantly predicted CD symptoms, but with a low regression coefficient ($\beta = .06, p < .01$). Interestingly, when impulsivity was high and grandiosity was low the association between CU traits and CD symptoms did not reach significance ($\beta = -.02, p = .64$).

Longitudinal associations with CD symptoms

Similar to the cross-sectional analysis, gender and age was significantly associated with Time 2 CD, suggesting that boys and adolescents scored higher on CD symptoms than girls and children, respectively. In addition, all three psychopathy dimensions predicted Time 2 CD symptoms, although after including Time 1 CD symptoms the association between grandiosity and Time 2 CD dropped to non-significance. Although the associations with CU and impulsivity remained significant, the beta coefficients were much lower than the ones reported in the cross-sectional analysis. The significant interactions between CU traits with gender and age indicated that the association between CU traits and CD was significant for boys ($\beta = .09, p < .001$) but not girls ($\beta = .03, p = .23$), and was significant for adolescents ($\beta = .08, p < .001$) but not children (β

= .03, $p = .46$).

The significant interaction between CD and CU traits is depicted in Figure 2. As shown in the figure, a stronger association between CD at Time 1 and CD at Time 2 was obtained when CU traits were low ($\beta = .62, p < .001$), than when CU traits were high ($\beta = .45, p < .001$). This finding possibly suggests that the continuity of CD symptoms is also influenced by CU traits, since as demonstrated in the figure, the group of youth high on CU-traits alone showed moderate levels of CD. Importantly, both groups of children high on CD with or without CU traits scored above the clinical cut-off on Time 2 CD.

The interaction between CD, impulsivity, and grandiosity was the only significant 3-way interaction. As shown in Figure 3, youth high on CD who also scored high on impulsivity and grandiosity showed the highest levels of Time 2 CD ($M_{\text{difference}} = 1.14\text{-}1.79$), although all children scoring high on Time 1 CD, irrespective of psychopathic traits, scored above the clinical cut-off score. The effect of Time 1 CD on Time 2 CD did not vary greatly across groups with beta coefficients ranging from .49 (low impulsivity and low grandiosity) to .57 (high impulsivity and high grandiosity). Finally, the 4-way interaction between CD and all three psychopathy dimensions was non-significant.

Discussion

This study has attempted to address the question of whether CU traits alone can predict CD in childhood and adolescence – or whether instead the presence of other psychopathic traits, specifically impulsivity and grandiosity, also need to be taken into account when assessing risk for severe CD. The findings of the study do in fact suggest that CU traits alone cannot fully account for CD variability, and at least the cross-sectional findings indicate that the association between CU traits and CD symptoms was stronger among individuals also showing high

grandiosity and impulsivity. In fact, only youth with a combination of psychopathic traits scored above the clinical cut-off score on CD symptoms. Findings also indicate that it is important to examine both cross-sectional and longitudinal associations, as well as take gender and developmental differences into account to understand CD symptoms.

The 3-way interaction identified in the cross-sectional model suggests that CU traits and grandiosity mutually potentiate each other, so that in the presence of both characteristics much higher levels of CD can be expected – while the added presence of impulsivity can further aggravate a young person's clinical presentation. To understand the underlying psychological mechanism that is expressed through this interaction, it might help to consider the motivational salience of different psychopathic traits. CU traits, it can be argued, serve to de-motivate youth from pro-social interactions by blunting the desire to show empathy, seek out emotional connectedness or fulfill academic obligations (Frick & Viding, 2009). Grandiosity, in contrast, actively motivates youth to maintain their own grandiose self-image and meet their own self-centered needs, while disregarding the needs of others (Fanti & Henrich, 2015). In the absence of grandiosity, a child or adolescent with CU traits might come across as bored and uninterested, but without developing a versatile antisocial profile. At the other extreme, a youth with grandiose characteristics that lacks CU traits would be internally torn between self-centered desires and a prosocial conscience that forces remorse when the needs of others are violated, so once again outbreaks of antisocial behavior would logically be limited. In contrast, the combination of grandiose and CU traits might be providing the 'optimal' combination of active antisocial motivation with inhibition of prosocial tendencies, leading to a clinical presentation of unrestrained CD behaviors. In this potent combination of ingredients, impulsivity can then serve as a further catalyst of CD (Fanti, Kimonis, et al., 2016), by disabling the young person's

capacity to inhibit CU/grandiose-driven antisocial impulses when it would have been socially expedient to do so. These findings agree with suggestions that the combination of psychopathy dimensions is associated with severe and clinical levels of CD (e.g., Andershed et al., 2008; Frick et al., 2000).

While the cross-sectional component of the study suggests possible mechanisms to explain the role of psychopathic traits in the development of CD, the longitudinal component is more helpful in understanding what drives the stability of CD, after the initial presentation of symptoms has set in. In this regard, it is worth noting that of all psychopathy dimensions, CU was found to be the most significant predictor of CD after initial levels of CD were taken into account. Superficially, this might seem to argue in favor of a commonly expressed view, namely that CU youth experience lower salience of punitive social signals after developing CD symptoms, therefore do not respond to society's attempts to correct them, and as a result develop more chronic and severe forms of CD (Fanti, 2016; Fanti, Panayiotou, et al., 2016; Frick & Ellis, 1999). However, in explicating the interaction between baseline CD and levels of CU it becomes evident that the high baseline CD / high CU youth and high baseline CD / low CU youth are equally likely to display elevated CD one year later, and in fact both groups reached clinically significant levels (see also Fanti, 2013). Further, CU in the present study was associated with the gradual emergence of mild CD symptoms in youth that were previously asymptomatic in terms of CD symptoms, but not with more robust stability of CD symptoms, in those already presenting with CD. This is a surprising finding, in contrary to common theoretical formulations (e.g., Frick et al., 2014). Another reliable pathway to the temporal stability of CD appears to be the combination of impulsivity and grandiosity – in other words, the combination of an active motivation to behave in self-centered and self-serving ways, combined with an inability to inhibit

socially inappropriate behaviors. For these groups of children and adolescents, it is the unbridled drive to express self-serving behaviors and inability to self-regulate, rather than insensitivity to punishment cues, which seems to contribute the most to the temporal stability of CD symptomatology (Fanti, Kimonis, et al., 2016; Fanti & Henrich, 2015).

Regarding age differences, findings indicated that adolescents were at higher risk to engage in CD symptoms than younger ages (e.g., Moffitt, 1993). Adding to prior work, CU traits and impulsivity were found to more strongly predict adolescent than child CD symptoms. This finding agrees with suggestions that psychopathic traits are more stable during adolescence than childhood, and as a result might exert a greater influence on CD symptoms (Kyraniides et al., 2016). However, this interaction was not identified for grandiosity, possibly indicating that grandiosity is similarly associated with child and adolescent CD symptoms. The 2-way interactions between CU traits and age remained significant even after controlling for the longitudinal association with CD symptoms, suggesting that CU traits only predicted adolescent, but not child CD symptoms. These findings can inform the timing of prevention and intervention efforts and the importance of defining CD onset, a specifier currently included in the DSM-5 (APA, 2013). In terms of gender, findings converge with prior work that boys are more likely to engage in CD behaviors (e.g., Fanti, 2013). It was also interesting that CU traits were more strongly associated with boys than girls CD symptoms based on the cross-sectional analysis, and were only associated with future CD symptoms among boys. No gender differences were identified for grandiosity and impulsivity.

Limitations and Strengths

The above interpretations should be viewed within the context of several study limitations. As in most other large sample community-based studies, psychopathic traits were assessed

through self-report questionnaires in the adolescent sample; thus, effects associated with desirability bias might be influencing the results in subtle but important ways. However, similar associations were identified in the child and adolescent sample, indicating agreement between self- and parent-reports. Further, while the study is longitudinal, the lack of more waves of data precludes the use of growth modeling, a method which will have allowed a more robust investigation into factors that contribute to the temporal stability, deterioration or changes of CD symptoms. Beyond these limitations, the study also possesses several strengths: a large sample size that allows for the investigation of 3-way and 4-way interactions; a simultaneous focus on community youth of different ages (childhood and adolescence) and of both genders; and a combination of cross-sectional with longitudinal data analysis in a way that allows for the investigation of both moment and temporal dynamics in the association of psychopathy dimensions with CD.

Conclusion

This study suggests that it is important to take the interactions between all psychopathy dimensions into account to better understand CD. Importantly, although at the correlational level these traits were similarly associated with CD, the combination of all three dimensions better predicted the severity of CD symptoms. This combination might be important for the diagnosis of CD because only youth scoring high on all dimensions showed clinically significant levels of CD, in accordance with the cross-sectional analysis. These findings suggest that the simultaneous presence of CU traits, grandiosity, and impulsivity provides a unique combination of antisocial motivation with inhibition of prosocial tendencies, leading to CD. In contrast, the temporal stability of CD appears to be driven by distinct interactions between CD with grandiosity and impulsivity and between CD with CU traits, pointing to multiple developmental pathways

leading to CD. While these findings might suggest interesting entry points for the prevention and treatment of CD, additional research is required to validate the developmental mechanisms proposed in this study.

Compliance with Ethical Standards:

Funding: No funding was received for this study.

Conflict of Interest: Authors have no conflicts of interest

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from parents and assent was obtained from youth included in the study.

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Table 1. *Descriptive Statistics and Correlations among the Main Study Variables (Time N = 4318, Time 2 N = 3918).*

	CU traits	Impulsivity	Grandiosity	Time 1 CD	Time 2 CD
Impulsivity	.33**				
Grandiosity	.32**	.61**			
Time 1 CD	.40**	.46**	.49**		
Time 2 CD	.30**	.30**	.28**	.52**	
<i>Descriptives</i>					
<i>Mean</i>	23.33	4.72	4.13	2.97	3.39
<i>(SD)</i>	(8.94)	(2.95)	(3.38)	(4.88)	(5.37)

Note. ** $p < .01$; * $p < .05$.

Table 2. Predicting Time 1 CD ($N = 4318$).

	<i>B</i>	<i>SE</i>	β	ΔR^2
Step 1				.10
Gender	-2.58	.15	-.25**	
Age	2.05	.18	.17**	
Step 2				.27
CU traits	.12	.01	.21**	
Impulsivity	.32	.03	.19**	
Grandiosity	.45	.02	.29**	
Step 3: 2-way interactions				.09
CU x gender	-.07	.02	-.20**	
CU x age	.07	.02	.23**	
Impulsivity x age	.16	.07	.17*	
CU x Impulsivity	-.01	.01	-.04*	
CU x Grandiosity	.03	.01	.18**	
Impulsivity x Grandiosity	.05	.01	.15**	
Step 4: 3-way interactions				.01
Impulsivity x Grandiosity x CU	.002	.001	.11**	

Note. ** $p < .01$; * $p < .05$.

Table 3. Predicting Time 2 CD ($N = 3918$).

	B	SE	β	ΔR^2
Step 1				.14
Gender	-3.14	.19	-.27**	
Sample	3.29	.23	.24**	
Step 2				.09
CU traits	.10	.01	.15**	
Impulsivity	.23	.04	.12**	
Grandiosity	.21	.04	.13**	
Step 3				.10
CU traits	.05	.01	.07**	
Impulsivity	.10	.04	.06*	
Grandiosity	.03	.03	.02	
CD (Time 1)	.46	.02	.40**	
Step 4: 2-way interactions				.01
CU x gender	-.07	-.16	-.07**	
CU x age	.09	.03	.24**	
CU x CD	.01	.01	.11**	
Step 5: 3-way interactions				.01
Impulsivity x Grandiosity x CD	-.002	.001	-.11**	

Note. ** $p < .01$; * $p < .05$.

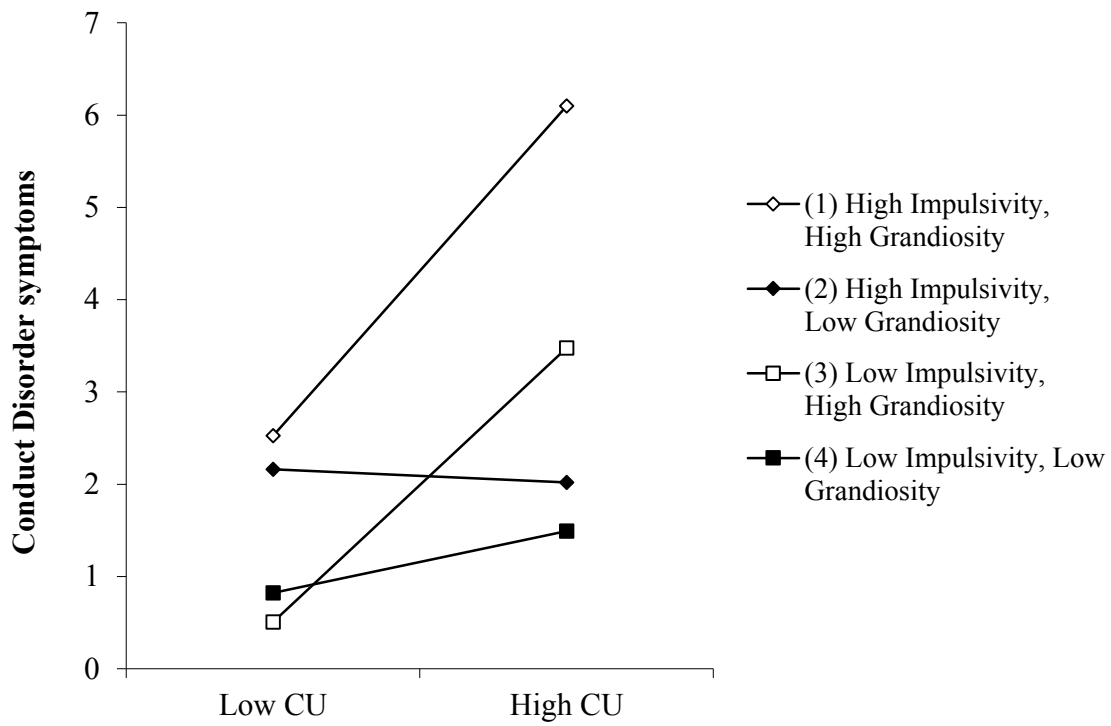


Figure 1. The interaction between CU traits, impulsivity, and grandiosity predicting Time 1 CD symptoms.

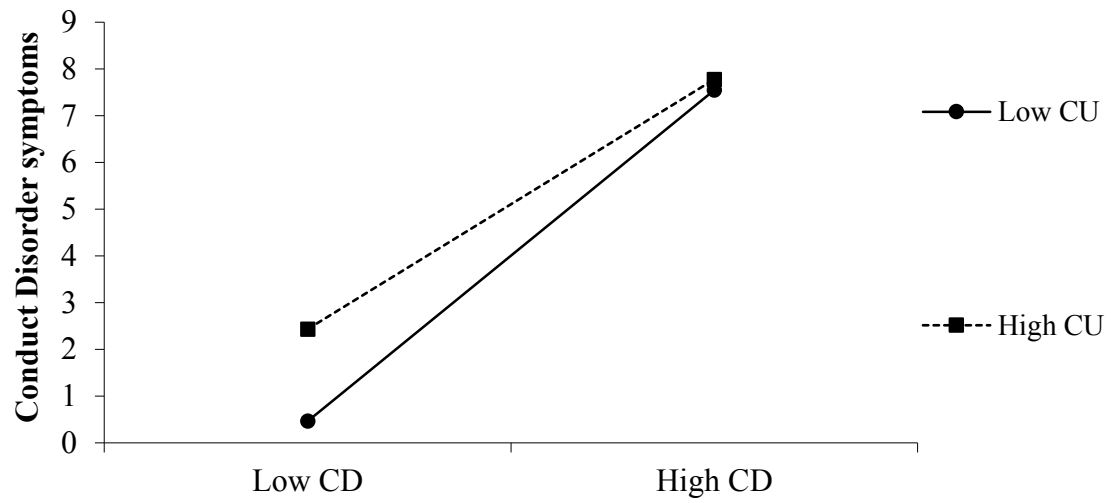


Figure 2. The interaction between Time 1 CD symptoms and CU traits predicting Time 2 CD symptoms.

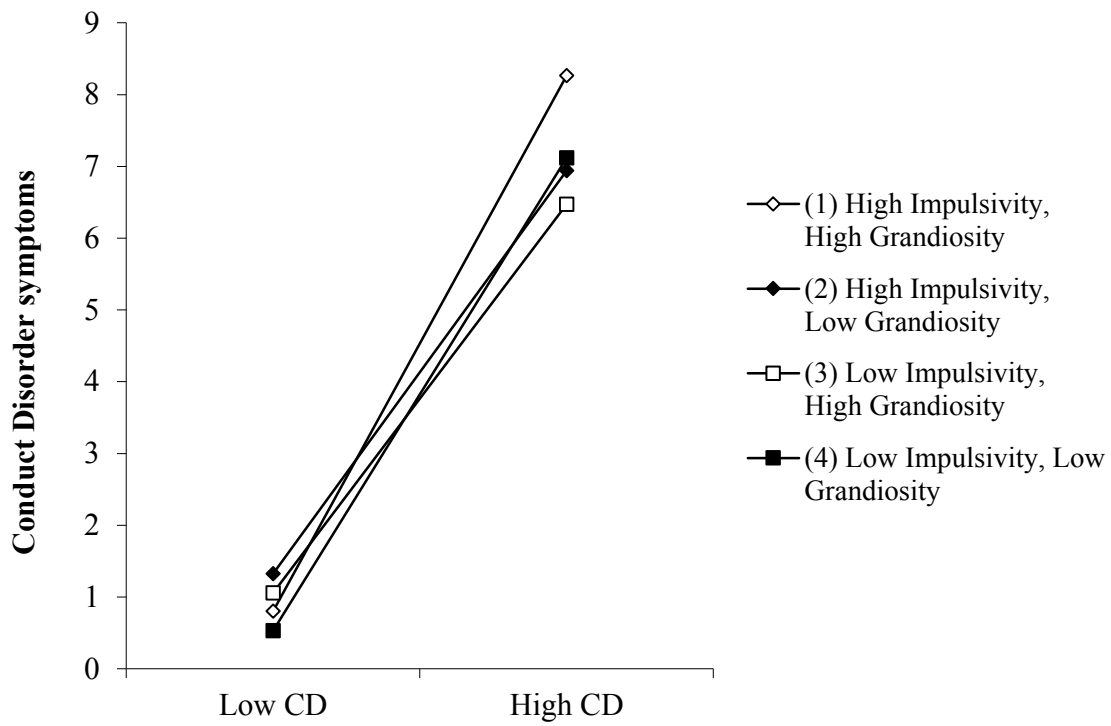


Figure 3. The interaction between Time 1 CD symptoms, impulsivity, and grandiosity predicting Time 2 CD symptoms.